

## Claims

1. A linear or bus optical network comprising:

- first and second end nodes and
- a plurality of primary nodes disposed, in use, between the end nodes,

wherein each end node is connected to its nearest neighbouring primary node and its 2<sup>nd</sup> nearest neighbouring primary node, and

wherein each primary node is connected to its 2<sup>nd</sup> nearest neighbouring primary or end node on either side, or, where one of its nearest neighbouring nodes is one of the end nodes, to said one end node and to its 2<sup>nd</sup> nearest neighbouring primary or end node on the other side.

2. A network as claimed in claim 1, wherein the optical connection between neighbouring nodes is effected through a pair of optical fibres, and

wherein each fibre of the pair is arranged, in use, to carry bi-directional transmission, and

wherein each primary node is connected to only one fibre of the pair on each side, whereby the primary nodes are alternately connected via single fibre connections, and

wherein each end node is connected to both fibres of the pair.

3. A network as claimed in claim 1, wherein the optical connection between neighbouring nodes is effected through at least two pairs of optical fibres, and

wherein each fibre of the pairs is arranged, in use, to carry uni-directional transmission, with the transmission directions of the two fibres of each pair being opposite to each other, and

wherein each primary node is connected to one of the pairs on each side, whereby the primary nodes are alternately connected via a pair of uni-directional fibres for bi-directional transmission, and

wherein each end node is connected to both fibre pairs.

4. A network as claimed in any one of the preceding claims, wherein the network further comprises one or more secondary nodes, wherein each secondary node is connected in-line between two connected ones of the end or primary nodes.

5. A network as claimed in claim 1, wherein each of the nodes is arranged, in use, to regenerate the transmission signal.

6. A network as claimed in claim 1, wherein the network is arranged as a WDM network.

7. A network as claimed in claim 1, wherein the network is arranged as a SONET or SDH network.

8. A network as claimed in claim 1, wherein one of the end nodes is connected to a core or metro optical network.

9. A network as claimed in claim 8, wherein the core or metro optical network is a protected optical ring-network.

10. A method of conducting transmission in a linear or bus optical network comprising two end nodes and a plurality of primary nodes disposed between the end nodes, the method comprising the steps of:

- transmitting from each end node to its nearest neighbouring primary node and to its 2<sup>nd</sup> nearest neighbouring primary node, and

- transmitting from each primary node to its 2<sup>nd</sup> nearest neighbouring primary or end node on either side, or, where one of its nearest neighbouring nodes is one of the end nodes, to said one end node and to its 2<sup>nd</sup> nearest neighbouring primary or end node on the other side.

11. A method as claimed in claim 10, wherein the transmitting between neighbouring nodes is effected utilising pair of optical fibres, and

wherein each fibre of the pair carries bi-directional transmission, and

wherein each intermediate node is connected to only one fibre of the pair on each side, whereby the intermediate nodes are alternately connected via single fibre connections, and

wherein each end node is connected to both fibres of the pair.

12. A method as claimed in claim 10, wherein the transmitting between neighbouring nodes is effected utilising at least two pairs of optical fibres, and

wherein each fibre of the pairs carries uni-directional transmission, with the transmission direction of the two fibres of each pair being opposite to each other, and

wherein each primary node is connected to one of the pairs on each side, whereby the primary nodes are alternately connected via a pair of uni-directional fibres for bi-directional transmission, and

wherein each end node is connected to both fibre pairs.

13. A method as claimed in any one of claims 10 to 12, wherein the step of transmitting between two connected ones of the end or primary nodes comprises transmitting where one or more secondary nodes connected in-line between said to connected nodes.

14. A method as claimed in claim 10, wherein the method further comprises the step of regenerating the transmission signal at each node.

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